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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/553,149	11/28/2006	Hartmut Sauer	68001-004US1	1797

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OCCHIUTI ROHLICEK & TSAO, LLP
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CAMBRIDGE, MA 02138

EXAMINER

KRUPICKA, ADAM C

ART UNIT	PAPER NUMBER
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1794

NOTIFICATION DATE	DELIVERY MODE
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01/26/2010

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

INFO@ORTPATENT.COM

Office Action Summary	Application No. 10/553,149	Applicant(s) SAUER, HARTMUT	
	Examiner Adam C. Krupicka	Art Unit 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 November 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>03/03/2006</u> . | 6) <input type="checkbox"/> Other: ____. |

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DETAILED ACTION

Specification

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
- (e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.
- (f) BACKGROUND OF THE INVENTION.
 - (1) Field of the Invention.
 - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (g) BRIEF SUMMARY OF THE INVENTION.
- (h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (i) DETAILED DESCRIPTION OF THE INVENTION.
- (j) CLAIM OR CLAIMS (commencing on a separate sheet).
- (k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
- (l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 5 and 22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention.

It is unclear what applicants intend in **claim 5** by the phrase “in particular”. The phrase “in particular” is considered to be indefinite because it is not clear if the limitation is definitively required. As such, for the purposes of examination, the phrase “in particular a polymer reinforced with carbon fibre” will not be considered to be required by the claim.

Regarding applicants’ **claim 22**, the use of parentheses to indicate examples of the claimed categories of use renders the claim indefinite because it is unclear whether the limitation(s) in the parentheses are part of the claimed invention. See MPEP § 2173.05(d). Since it is unclear whether or not the use must be selected from the items in parentheses, the items listed in the parentheses will not be considered to be required for the purposes of examination.

Claim Rejections - 35 USC § 102/103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4, 6, 9-14, 21 and 22 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Jimarez *et al.* (US Pat. 5,509,557).

Regarding applicants' claims 1, 3, 4, 6, 11, 12, 13, and 14, Jimarez *et al.* teach the deposition of a conductive metal on a substrate, where the substrate is a dielectric material such as thermoplastic and thermosetting resin, including polyamides, polypropylene, polysulfones, and is more typically an FR-4 epoxy (*considered to be the non-metallic layer, col. 3 lines 39-62*). The conductive metal is deposited through the process of roughening the surface of the substrate with the use of a metal sheet having a R_a value of 0.05 to 0.08 mils or 1 to 2 micrometers (*considered to be less than 5 μ m*) in order to increase seed retention of the substrate. The substrate is then activated and electrolessly plated with a conductive metal such as nickel or copper (*col. 4 lines 14-24 and col. 6 lines 44-53*). Applicants teach the non-metallic layer to be composed of polymers such as polyamide, polypropylene, polysulfones and epoxy resins, where the non-metallic layer is roughened with a blasting agent, the surface is activated and the metal layer is electrolessly plated. With respect to the process of roughening the surface it is noted that both Jimarez *et al.* and applicants achieve surfaces of similar roughness values and would therefore be expected to provide similar surfaces with similar properties and behavior. Articles formed of similar materials in a similar manner are considered to have similar properties. One of ordinary skill in the art at the time of the invention would have expected the laminated metallic and non-metallic layers of applicants and Jimarez *et al.* to have similar properties such as adhesive strength, given that both are composed of similar materials by a similar process as shown above. "Where...the claimed and prior art products are identical or substantially

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identical, or are produced by identical or substantially identical processes, the PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product. Whether the rejection is based on “inherency” under 35 USC 102, on “prima facie obviousness” under 35 USC 103, jointly or alternatively, the burden of proof is the same, and its fairness is evidenced by the PTO's inability to manufacture products or to obtain and compare prior art products. See *In re Brown*, 59 CCPA 1036, 459 F.2d 531, 173 USPQ 685 (1972).” *In re Best, Bolton and Shaw* 195 USPQ 430 (CCPA 1977).

With respect to applicants claimed R_z (*considered to be mean roughness depth*) it is noted that Jimarez *et al.* teaches an R_{max} of 0.20 to 0.55 or 5.0 to 14 μm (*maximum peak to valley height, col. 4 lines 25-32*), which is less than the claimed maximum R_z . Therefore the roughened surface of Jimarez *et al.* would not have an R_z greater than 35 μm .

Regarding applicants' claim 2, Jimarez *et al.* teach the metallic layer to be deposited by electroless plating as shown above (*considered to be applied not by CVD, PVD or laser treatment*). With regards to the no chemical pretreatment it is noted that Jimarez *et al.* only require a water rinse prior to activation of the surface, which is not considered to be a chemical pretreatment. Nevertheless the process by which the metal layer is deposited is not considered to require any further structural limitations of the claimed composite beyond the claimed roughness. “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior art

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product was made by a different process”, *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Further, “the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product”, *In re Marosi*, 710 F.2d 798, 802, 218 USPQ 298, 292 (Fed Cir. 1983). See MPEP 2113.

Therefore, absent evidence of criticality regarding the presently claimed (process) and given that Jimarez *et al.* meets the requirements of the claimed composition (*along with surface roughness, surface activation and electroless plating*) the present claim is not considered to establish a patentable distinction over the composite article of Jimarez *et al.*

Regarding applicants' claims 9 and 10, the substrate of Jimarez *et al.* is not disclosed to have material deposited on the side opposite the conductive metal, and is therefore considered to be the surface of the article. However, with respect to the case where the non-metallic layer is not the surface layer, it is noted that one of ordinary skill in the art at the time of the invention would have found it obvious to introduce a reinforcing backing material. The additional backing would provide greater strength and durability to the composite, thereby extending its useful life.

Regarding applicants' claim 22, Jimarez *et al.* teach the deposition of a conductive metal on a substrate within the context of printed circuit boards (*considered to be a structural part for the electronics industry, col. 1 lines 15-18*).

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jimarez *et al.* as applied to claim 1 above, further in view of Cassidy *et al.*

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Jimarez *et al.* teach the deposition of a conductive metal on a substrate for use in printed circuit boards, where the surface of the substrate is roughened prior to deposition of the conductive metal (*as shown above*), but do not appear to explicitly disclose roughening of the surface by a blasting agent. However Cassidy *et al.* teach the roughening of an epoxy substrate for use in a printed circuit board with a blasting agent prior to activating the surface and electrolessly plating a metal layer. *See col. 2 lines 15-49*. It would have been obvious to one of ordinary skill in the art at the time of the invention to use an abrasive blasting agent, because it is an effective known method useful in increasing the adhesion of electrolessly plated metal layers in the production of printed circuit boards.

Claims 5, 7, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jimarez *et al.* as applied to claim 1 above, further in view of Harris *et al.* (US Pat. 4,520,067)

Jimarez *et al.* teach the deposition of a conductive metal on a substrate for use in printed circuit boards as shown above but do not appear to explicitly teach the substrate to be reinforced with carbon fibers having a diameter of less than 10 μ m. However Harris *et al.* teach compositions useful for making circuit board substrates, including the use of carbon fiber as a reinforcing material (*col. 3 lines 50-58*). It would have been obvious to one of ordinary skill in the art at the time of the invention to include carbon fibers in the substrate of the printed circuit board of Jimarez *et al.* in order to increase the circuit boards strength and durability thereby extending its useful life.

With respect to the diameter of the carbon fiber it would have been obvious to one of ordinary skill in the art to adjust the fiber diameter to achieve the greatest substrate strength

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possible while maintaining a substrate surface which is adequate for depositing conductive metal for circuits.

Claim 15, 16, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jimarez *et al.* as applied to claim 1 above, further in view of Nakamura *et al.* (US Pat. 5,232,744).

Jimarez *et al.* teach the deposition of a conductive metal on a substrate for use in printed circuit boards as shown above but do not appear to explicitly teach the addition of non-metallic particles such as silicon carbide or molybdenum disulfide. However Nakamura *et al.* teach the addition of non-metallic particles to electrolessly plated metallic layers including silicon carbide and molybdenum disulfide depending on the particular application (*col. 3 lines 11-18*). One of ordinary skill in the art at the time of the invention would have found it obvious to include any number of the particles taught by Nakamura depending on the articles intended use. For instance circuits which serve as connectors or which plug in and make contact with electrical sockets would be recognized by one of ordinary skill in the art to benefit from the inclusion of either a hard abrasive particulate matter such as silicon carbide or a solid lubricant such as molybdenum disulfide. Examples of instances where circuit boards interconnect include such articles as expansion cards and memory for computers. Where there is a physical electrical contact between devices the inclusion of abrasive particles insures contact where oxide layers, dust, or corrosion may be present. By using abrasive particles the surface is slightly abraded each time the device is connected and disconnected ensuring clean contact. Lubricative particles on the other hand ensure that the connection is made with the least amount of friction possible thereby

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minimizing the force necessary for one to interconnect the two objects. Further with regards to the hardness of the particles, silicon carbide is considered to have a Vickers hardness of 2800

(See <http://www accuratus.com/silicar.html>)

Claims 1-4, 6, 9-11, 13-15, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Belouet *et al.* (PGPub US 2003/0031803).

Belouet *et al.* teach a method for metallizing a substrate part, where the part may be used in PCBs, antennas, microchip cards, etc. (*paragraph 0004*). Belouet *et al.* further teach a substrate comprising a polymer to which a layer of composite material with dielectric particles is applied. Deposition of a copper layer follows the formation of the first layer. A specific adhesion of 1.4 kg/mm² which converts to 13.8 N/mm² is taught for the copper layer (*paragraph 0044*). The polymer/dielectric layer is formed without electric current being applied, and the copper layer is not formed by thermal spray, CVD or PVD. With regards to the surface roughness, Belouet *et al.* teach achieving very smooth surfaces with the use of dielectric nanoparticles but does not specify the surface roughness. It would have been obvious to one of ordinary skill in the art at the time of the invention to adjust the smoothness (*roughness*) of the non-metallic surface to promote increased adhesion of the metallic surface thereto. As the instant claims recite "less than" ranges, it is considered to be consistent with the desire of Belouet to have a smooth surface (*low roughness*). Regarding any standard deviation of the adhesive strength, similar materials treated in a similar manner are expected to yield articles similar in structure and properties. "Where...the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the PTO

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can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product. Whether the rejection is based on “inherency” under 35 USC 102, on “prima facie obviousness” under 35 USC 103, jointly or alternatively, the burden of proof is the same, and its fairness is evidenced by the PTO's inability to manufacture products or to obtain and compare prior art products. See *In re Brown*, 59 CCPA 1036, 459 F.2d 531, 173 USPQ 685 (1972).” *In re Best, Bolton and Shaw* 195 USPQ 430 (CCPA 1977).

Claims 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Belouet *et al* (PGPub US 2003/0031803) as applied to claim 1 above, further in view of Suzue *et al.* (US 6,088,947).

Belouet *et al.* teach a method for metallizing a substrate part with an electroless copper layer as shown above, but does not appear to explicitly teach formation of a layer of aluminum or titanium or several other layers. Suzue *et al.* however teach the formation of a metal film of aluminum or titanium to form a desired coloration on an exterior of an article. The aluminum layer has a high refraction factor so that the exterior is bright (*col. 15, lines 18-32*). It would have been obvious to one of ordinary skill in the art at the time of the invention to apply the layer of Suzue *et al.* to the article of Belouet *et al.* in order to modify the aesthetic design of the exterior via color or brightness. Additionally, it is noted that the substrate of Suzue *et al.* may be a polymer. With regard to the additional layers, metallic layers may be formed including Ni and Ti layers, or a plurality of films made of the metallic materials (*col. 10 lines 25-28*) may be used to form a decoration film. Further one of the film materials may be alumina and it would have been obvious to form the decorative layers of materials to achieve the desired coloration or aesthetic

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effect. The court has found that matters relating to ornamentation only which have no mechanical function cannot be relied upon to patentably distinguish the claimed invention from the prior art. *In re seid*, 161 F.2d 229, 73 USPQ 431 (CCPA1947)

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure includes Jansson (US Pat. 4,231,982) which teaches a metal/non-metal composite.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Adam C. Krupicka whose telephone number is (571)270-7086. The examiner can normally be reached on Monday - Thursday 7:30am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Adam C Krupicka/
Examiner, Art Unit 1794

/Jennifer McNeil/
Supervisory Patent Examiner, Art Unit 1794